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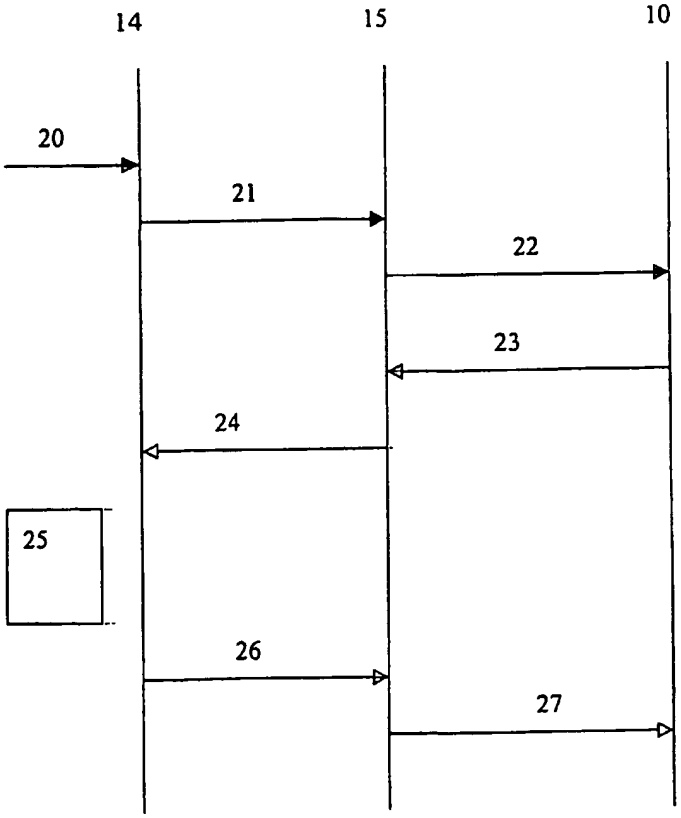
(54) Title: METHOD OF SWITCHING COMMUNICATIONS IN A CELLULAR MOBILE COMMUNICATION SYSTEM



(57) Abstract: A method of switching communications in a cellular mobile communication system is described. The cellular mobile communication system comprises a first type switching center (14) and a second type switching center (15), each for handling respective kinds of communications. When the first type switching center receives notification of a new communication to a destination mobile station, and if the destination mobile station is in the process of conducting a communication of the second kind handled by the second type switching center, then the second type switching center is contacted in order to request communication condition information for communications of the first kind in the momentary cell of the destination mobile station and surrounding cells, such that the first type switching center can determine a most suitable cell for switching the new communication of the first kind to the destination mobile station, and does not automatically use the momentary cell of the destination mobile station, in which the communication of the second kind is being conducted.

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Method of switching communications in a cellular mobile communication system

[Field of the invention]

The present invention relates to a method of switching communications in a cellular mobile communication system, and to switching centers and mobile stations capable of performing the method.

[Background of the invention]

In mobile communication systems, it is known to divide an overall area of communication service into sub-units, which are sometimes called "cells", and a corresponding mobile communication system is consequently called "cellular". A schematic example of the architecture of such a cellular communication system is shown in Fig. 1a and 1b.

Fig. 1a schematically shows cells C1 to C7 and one mobile station 10 operating in cell C7. The cells C1 to C7 are connected with respective base stations (BS) 11-13. Furthermore, a first type switching center 14 and a second type center 15 are shown. The switching centers 14 and 15 are arranged to control the switching of communications to mobile stations operating in the cells. The base stations are arranged to handle the communication between the cells and the switching centers. Fig. 1a additionally shows a gateway 16, which provides a bridge to other communication networks, e.g. a public switched telephone network (PSTN).

The first type switching center 14 is arranged to control the switching of communications of a first kind, and the second type switching 15 is arranged to control the switching of communications of a second kind. For example, communications

of the first kind can be circuit-switched communications, whereas the communications of a second kind can be packet-switched communications.

It may be noted that in the context of the present specification and claims, the term "cell" is used generically to relate to any limited sub-division of an overall area of service. The sub-division can be provided in physical terms, e.g. in terms of location, or in logical terms, e.g. as a sub-division of an address space. As such, the term "cell" as used in the present specification and claims is a generic expression for any type of sub-division, such as micro-cells, macro-cells, service areas, routing areas, etc. Consequently, the term "cellular" as used in the context of the present specification and claims relates to any communication system that sub-divides an overall area of service.

Fig. 1b shows a schematic representation of the dividing of an overall area of service into seven cells C1 to C6, where each cell is represented as a hexagon comprising a transceiver, which is represented by an antenna symbol. In the example of Fig. 1b, the mobile station 10 is shown as being associated with cell C7.

It should be noted that the representation is Figs. 1a and 1b is only schematic, and that a real cellular mobile communication may comprise a far larger number of mobile stations, cells, base stations, switching centers and gateways.

An example of a cellular mobile communication system having the structure shown in Fig. 1a is a system operating in accordance with the CMS30 standard, or a system using GSM (Global System for Mobile communication) and GPRS (General Packet Radio Service). In these standards, the first type switching center 14 can be a switching center for circuit-switched communications, and is called mobile switching

center (MSC), and the second type switching center 15 can be a switching center for packet-switched communications, and is called a packet mobile switching center (PMSC).

In the CMS30 standard, when the MSC receives notification of a new circuit-switched communication for a given mobile station that is the destination of said new communication, the MSC determines whether the destination mobile station is in the process of conducting a packet-switched communication controlled by the PMSC or whether it is idle. If the mobile station is idle, the MSC pages the mobile station and indicates the new communication, whereupon the mobile station sends a so-called terminating condition report in which the mobile station reports on the communication conditions within the cell it is presently located, and in surrounding cells. Using this information, the MSC determines which cell is the best cell to try and allocate a traffic channel for the mobile station, so that the user can take up the communication if he wishes. If the MSC can not allocate a traffic channel in the best cell it tries the next best cell, and so on, until a traffic channel is activated and the communication can proceed.

On the other hand, if the MSC determines that a packet-switched communication is underway in the mobile station that is the destination of the new communication, the MSC sends a paging message to the PMSC handling the packet-switched communication. The PMSC supplies the MSC with an identification of the transceiver serving the destination mobile station. The transceiver is connected to the base station through which the PMSC sends packets over the air to the mobile station. From the transceiver identity, the MSC can determine the cell that is serving the mobile station. Then the MSC attempts to allocate a traffic channel for the new circuit-switched communication in that cell. Once a traffic channel is allocated, the MSC sends a message to the PMSC, in which the PMSC is instructed to request the

destination mobile station to switch to the assigned traffic channel.

[Object of the invention]

The object of the invention is to provide an improved method of handling communications in a cellular mobile communication system having a first type and a second type switching center, and to provide corresponding switching centers and mobile stations capable of executing the method.

[Summary of the invention]

This object is solved by the method of claim 1, and the devices of claims 6 to 8. Advantageous embodiments are described in the dependent claims.

In accordance with the invention, in a cellular mobile communication comprising a first type switching center and a second type switching center, when the first type switching center receives notification of a new communication to a destination mobile station and said destination mobile station is conducting a communication of a second kind under control of the other second type switching center, a notification is sent to the second type switching center and the second type switching center sends a request to the destination mobile station for information on the communication conditions for communications of the first kind in the momentary cell through which the mobile station is conducting the communication of the second kind, and one or more neighboring cells, whereupon the destination mobile station sends corresponding communication condition information to the second type switching center via a second type communication, and the second type switching center then forwards the communication condition information that relates to the communication condition for communications of the first kind to the first type switching center. Finally, the

first type switching center than performs a switching determination procedure for determining a cell through which the new communication of the first kind is to be switched to the destination mobile station on the basis of the received communication condition information.

Employing the above-described method in a cellular mobile communication system provides the advantage that even when a mobile station that is the destination of a new communication of the first kind (e.g. a circuit-switched voice call) is conducting a communication of the second kind (e.g. a packet-switched web-browsing session in the Internet), the new communication of the first kind is not automatically switched to the cell in which the destination mobile station is conducting the communication of the second kind. Rather, the first type switching center handling the new communication of the first kind obtains communication condition information on the cell in which the destination mobile station is conducting the communication of the second kind, and on one or more neighboring cells, to thereby be able to determine whether the cell in which the destination mobile station is conducting the communication of the second kind is the most suitable for also conducting the communication of the first kind. Depending on the criteria for determining a best cell, e.g. the cell in which a predetermined channel for signal strength measurements has the highest signal strength, it is possible that one of the neighboring cells is better suited.

When considering the above example of a system operating in accordance with the CMS30 standard, which is a system in which the present invention can be applied, the inventor recognized that there exists a problem in that when a new circuit-switched communication is to be set-up and the destination mobile station is idle, a most suitable or best cell is selected on the basis of communication condition information for circuit-switched communications, whereas when the destination mobile station is conducting a packet-

switched communication, it is automatically attempted to set-up the circuit-switched communication in the cell in which the packet-switched communication is being conducted. This might not be the most suitable or best cell, and in fact it could happen that this cell is completely unsuitable for the circuit-switched communication, as there e.g. might not be any free circuit-switched channels. This would mean that the circuit-switched communication cannot be placed, which would not have happened if the destination mobile station had been in an idle mode. When applying the concept of the present invention, a best or most suitable cell can be looked for, even if the destination mobile station is in the course of a packet-switched communication, such that the above situation does not arise. Therefore, the concept of the present invention provides improved capabilities and service.

[Brief description of drawings]

The present invention will now be explained in connection with preferred embodiments, which are intended to be examples of the inventive concept, but are not to be understood as restricting the invention, with reference to the enclosed drawings in which

Figs. 1a and 1b
schematically show a cellular mobile communication network;

Fig. 2 schematically shows messages exchanged between a first type switching center, second type switching center and mobile station operating in accordance with an embodiment of the present invention;

Fig. 3 shows a flow chart of a control procedure executed in a first type switching center operating in accordance with an embodiment of the present invention;

Fig. 4 shows a flow chart of a control procedure executed at a second type switching center operating in accordance with an embodiment of the present invention;

Fig. 5 shows a flow chart of a control procedure executed at a mobile station operating with an embodiment of the present invention; and

Fig. 6 is a schematic and partial representation of a mobile station.

[Detailed description]

In the following, an example of the present invention will be described in the context of the above mentioned CMS30 standard. As such, the example given for the first type switching center will be a mobile switching center MSC handling circuit-switched communications, and the example given for the second type switching center will be a packet mobile switching center PMSC handling packet-switched communications to a mobile station. Examples of circuit-switched communications handled by the MSC are voice calls and short message service (SMS) communications, whereas examples of packet-switched communications are web-browsing sessions in the Internet or email communications.

However, it should be noted that the general concept of the present inventions is applicable to any cellular mobile communication system comprising a first type switching center and a second type switching center for handling respective kinds of communications. Namely, the invention is also applicable to the case where the first type switching center and second type switching center both handle circuit-switched communications or both handle packet-switched communications, and the distinction between communications of a first kind

and of a second kind lies with the type of content being transported. In other words, although the first type and second type switching center might control the set-up of circuit-switched communications, the first type switching center could be responsible for voice calls whereas the second type switching center could be responsible for data transmissions (i.e. in the case where data transmissions are also circuit-switched). This could also be the case when both switching centers set-up packet-switched communications (i.e. in the case where voice calls are also packet-switched).

In general, the invention can be applied to a cellular mobile communication network operating in accordance with any given standard, such as GSM, GPRS, UMTS (Universal Mobile Telephone System), AMPS (Advanced Mobile Phone System) or D-AMPS (Digital Advanced Mobile Phone System).

The present invention can therefore be applied in the context of the system shown in Fig. 1a and 1b, without being restricted thereto. The description in connection with Figures 1a and 1b is herewith incorporated into the disclosure of the present invention.

Fig. 2 shows a schematic representation of signals sent between the first type switching center 14, e.g. a mobile switching center for circuit-switched calls, the second type switching center 15, e.g. a packet mobile switching center for packet-switched communications, and a mobile station 10, e.g. a mobile telephone. Flow charts of control procedures conducted in each of the elements 14, 15 and 10 are shown in Figs. 3, 4 and 5, respectively.

Returning to Fig. 2, the first type switching center 14 initially receives a notification 20 of a new communication of the first kind to be switched to a mobile station 10 that is the destination of said new communication. The notification 20 can e.g. be sent by the gateway 16, when the

new communication comes from a different communication network (such as a PSTN), or can also from one of the base stations 11 to 13, which forward a communication request from a mobile station operating in one of the cells covered by the network. The notification 20 contains a suitable identifier of the mobile station that is the destination of the communication (where this mobile station will be referred to as the destination mobile station in the following), e.g. in form of an IMSI (International Mobile Subscriber Identity) or TMSI (Temporary Mobile Subscriber Identity). The concept of subscriber identities and communication requests is well known in the art and need not be explained in further detail.

After receiving the notification of a new communication of the first kind, the first type switching center 14 is arranged to conduct an appropriate control procedure in accordance with the present invention. An example of such a control procedure is shown in the flow chart of Fig. 3. It may be noted that in Fig. 1a, the first type switching center 14 is shown as comprising a controller 141. The controller is an entity arranged to execute a corresponding procedure, such as the one shown in Fig. 3 and can be provided by hardware, software or any combination of hardware and software. It may be noted that the second type switching center 15 comprises a corresponding controller 151, which is arranged to execute a control procedure in accordance with the present invention, an example of which is shown in Fig. 4, and as can be seen in Fig. 6 the mobile unit 10 comprises a controller 101 for executing a control procedure in accordance with the present invention, an example of which is shown in Fig. 5. Fig. 6 only shows selected parts of a mobile station 10, namely an antenna 104, a transceiver 103 for sending and receiving communications from a transceiver of the mobile communication network, and a signal processing and control section 102 that comprises the controller 101. Further conventional elements, such as a microphone, loudspeaker, keyboard, display, memory

for control procedures and data, etc. are not shown for simplicity and are well known to the skilled person.

Equally, the representation in Fig. 1a is only schematic. In addition to what was described in the introduction to the application, it shows a data base 17 that the first type switching center 14 and second type switching center 15 can access in order to obtain information related to mobile stations and subscribers using said mobile stations. Such a data base is e.g. also known as a home location register (HLR) and visitor location register (VLR), which are both well known in the art, such that a further description is not necessary here.

It may also be added that the first type switching center 14 and second type switching center 15 can be provided in a single physical location, e.g. one node of the cellular mobile communication network, or can be spread over several nodes.

Returning to the control procedure of Fig. 3, after having received the notification 20 of a new communication of the first kind, the first type switching center 14 determines whether the destination mobile station is conducting a communication of the second kind, step S30. This can e.g. be accomplished by accessing the record associated with the destination mobile station in the data base 17. If the destination mobile station is not conducting a communication of the second kind, the procedure goes to step S31, in which is determined whether the destination mobile station is idle or not. This can, e.g. be accomplished by checking an internal record of the first type switching center 14, in which it is recorded whether a communication of a first kind is already underway with the destination mobile station under control of the first type switching center. If a communication is already underway, then the outcome of step 31 is negative and the procedure passes to the step S38, in

which a mobile station busy procedure is conducted. The mobile station busy procedure if step S38 can be arranged in any desirable or suitable way, e.g. forwarding the new communication of the first kind to a mailbox function, or simply sending a refusal message to the originator of the new communication. The details of the mobile station busy procedure are of no importance for the present invention and shall therefore not be discussed further.

On the other hand, if the outcome of step S31 is that the destination mobile station is idle then the destination mobile station is paged in step S32, and the first type switching center 14 waits for a corresponding response. Then, when the response has been received, step S33 conducts a switching determination procedure for determining the most suitable cell and then determining a channel in this cell. The procedure for identifying a most suitable or best cell can be implemented in any suitable or desirable way, and can e.g. comprise evaluating signal strength measurements on predetermined channels in the cells under consideration, said signal strength measurements being examples of communication information received from the destination mobile station as a response to the paging in step S32. As an example, it is possible that the system is defined in such a way that each cell has a predetermined channel or "perch" channel, where the mobile station sends the signal strength for the perch channel of each cell under consideration to the first type switching center 14. Then, the most suitable or best cell is the cell having the highest signal strength on the perch channel. Naturally, this is only an example, and any known procedure of evaluating a most suitable cell for setting up a communication can be employed.

Then, when the most suitable cell has been determined, the first type switching center 14 attempts to allocate a channel for a communication of the first kind (e.g. a circuit-switched channel) in said cell. This can be done in

accordance with any known channel allocation scheme, such that no further description is necessary. If channel allocation in the most suitable cell is not successful (e.g. all channels are busy), the first type switching center 14 attempts to allocate a channel in the second best cell (e.g. the cell having a perch channel with the second highest signal strength). Finally, when a cell and channel are determined, the procedure goes to step S34, in which an instruction is sent to the destination mobile station for switching to the determined cell and channel. Thereafter, the communication is continued in well-known ways, such that a further description is not necessary.

If the outcome of step S30 is such that the first type switching center 14 determines that the destination mobile station 10 is conducting a communication of the second kind, it sends a notification message 21 (see Fig. 2) to the second type switching center 15 handling the communication of the second kind in which the destination mobile station is involved, and waits for a corresponding response, see step S35 in Fig. 3. If the network contains several second type switching centers, the second type switching center handling the ongoing communication of the second kind can e.g. be determined from the data base 17.

The second type switching center 15 then conducts a control procedure shown in Fig. 4. In step S41, a request 22 (see Fig. 2) for communication condition information is sent to the destination mobile station 10, and the second type switching center 15 waits for a response, see step S41 in Fig. 4. The request 22 relates to information on the communication conditions for communications of the first kind in the momentary cell (cell C7 in the example of Fig. 1) through which the destination mobile station 10 is conducting the communication of the second kind, and on one or more neighboring cells C1-C6. The intention of request 22 is therefore identical to that of the paging message sent in

step S32. However, it should be noted that request 22 is sent by the second type switching center 15, and is a communication of the second kind, in contrast to the paging message sent in S32, which is a communication of the first kind between the first type switching center and the destination mobile station 10. As an example, if the first type switching center 14 is an MSC and the second type switching center 15 is a PMSC, then the paging message is sent as a circuit-switched communication over a predetermined paging channel, whereas the request 22 is sent as a packet-switched communication, although it requests communication condition information for circuit-switched communications in the cell of the destination mobile station and neighboring cells.

In response to the request 22 for communication condition information, the destination mobile station 10 conducts a procedure shown in Fig. 5. In step S51, the communication conditions for communications of the first kind are determined in the present cell and at least one neighboring cell. It may be noted that the measurements of step S51 can be identical to those performed in receiving the paging message of step S32 of Fig. 3.

Preferably, the determination step S51 furthermore comprises determining the communication conditions on one or more channels in each respective cell. Namely, the determination procedure S51 can consist in measuring the signal strength on predetermined perch channels in each of the cells under consideration or can comprise measuring the signal strength on several available channels.

On the basis of the determined communication conditions, communication condition information is sent to the second type switching center 15 in a message 23 (see Fig. 2), step S52 of Fig. 5. This message 23 is again a communication of the second kind, e.g. a packet-switched communication that

carries information on the communication conditions for communications of the first kind, e.g. for circuit-switched communications.

It may be noted that the communication condition information sent in message 23 can be the direct measurement result of step S51 (e.g. measured signal strength value), or can be the result of processing conducted at the mobile station 10, e.g. a ranking of perch channels according to measured signal strength.

In response to receiving the communication condition information in message 23, the second type switching center 15 forwards the communication condition information to the switching center of the first kind, see message 24 in Fig. 2 and step S42 in Fig. 4.

It may be noted that the communication between the first type switching center and second type switching center can be conducted in any suitable or appropriate manner, e.g. the two switching centers can communicate with messages provided in accordance with the Transmission Control Protocol/Internet Protocol (TCP/IP). Expressed differently, if the first type switching center is arranged to control circuit-switched communications and the second type switching center is arranged to control packet-switched communications, then the exchange of messages between the first type switching center and the second type switching center can be conducted via a packet-switched communication (such as via TCP/IP), but could also equally well be conducted using a circuit-switched communication.

In response to receiving the communication condition information for communications of the first kind via message 24 (Fig. 2) the procedure of Fig. 3 at the first type switching center 14 goes to step S36, in which a switching determination procedure 25 (see Fig. 2) is conducted. The

switching determination procedure 25 determines a cell through which the new communication of the first kind is to be switched to the destination mobile station, on the basis of the communication condition information. The determination of a best or most suitable cell is determined as in step S33, such that a repeated description is not necessary. Also, once a most suitable cell is determined, the first type switching center 14 attempts to allocate an appropriate channel for communications of the first kind (e.g. a circuit-switched channel), and if this is not successful, goes to the second best cell and attempts to allocate a channel there, etc. Again, the procedure is identical to the one conducted in step S33.

After a cell and channel are determined, the procedure goes to step S37, in which an instruction 26 (Fig. 2) is sent to the second type switching center handling the communication of the second kind for the destination mobile station, where said instruction tells the destination mobile station to switch to the determined cell and channel.

The control procedure of Fig. 3 then continues as subsequent to step S34 described previously.

After having received the instruction 26, the second type switching center 15 forwards this instruction to the destination mobile station 10 via instruction 27. The instruction 27 is again a communication of the second kind, e.g. a packet-switched communication.

Although the present invention was described with the help of specific embodiments, these are only intended to be illustrative and not intended to be restrictive, as the invention is defined by the appended claims. Also, reference numerals in the claims serve to make the claims more legible and are not intended to be restrictive.

Claims

1. A method of switching communications in a cellular mobile communication system comprises a first type switching center (14) and a second type switching center (15), said first type switching center (14) being arranged to control the switching of communications of a first kind to mobile stations (10) in said cellular mobile communication system, and said second type switching center (15) being arranged to control the switching of communications of a second kind to mobile stations (10) in said cellular mobile communication system, said method comprising the steps:

- when the first type switching center (14) receives notification (20) of a new communication of the first kind to be switched to a mobile station (10) that is the destination of said new communication, said first type switching center (14) determining (S30) whether said destination mobile station (10) is conducting a communication of the second kind, and if so, sending (S35) a notification message (21) from said first type switching center (14) to said second type switching center (15),

- upon said second type switching center (15) receiving said notification message (21), sending (S41) a request (22) from said second type switching center (15) to said destination mobile station (10) for information on the communication conditions for communications of said first kind in the momentary cell (C7) through which the destination mobile station (10) is conducting the communication of the second kind and on one or more neighboring cells (C1-C6),

- upon said destination mobile station (10) receiving said request (22), said destination mobile station (10)

determining (S51) communication conditions for communications of said first kind in said momentary cell (C7) and at least one of said neighboring cells (C1-C6), and sending (S52) communication condition information (23) based on the determined communication conditions from said destination mobile station (10) to said second type switching center (15),

- forwarding (S42) said communication condition information from said second type switching center (15) to said first type switching center (14), and

- conducting (S36) a switching determination procedure (25) for determining a cell through which said new communication of the first kind is to be switched to said destination mobile station (10), on the basis of said communication condition information.

2. The method of claim 1, wherein said communications of a first kind are circuit-switched communications, and said communications of said second kind are packet-switched communications.

3. The method of claim 1 or 2, wherein said communications of a first kind are voice communications, and said communications of said second kind are data communications.

4. The method of one of claims 1 to 3, wherein said switching determination procedure (25) furthermore comprises determining a channel over which to switch said new communication of the first kind.

5. The method of one of claims 1 to 4, wherein said determining (S51) of communication conditions for communications of said first kind in said momentary cell (C7) and at least one of said neighboring cells (C1-C6)

by said destination mobile station (10) furthermore comprises determining the communication conditions on one or more channels in each respective cell.

6. A first type switching center (14) for a cellular mobile communication system that comprises a first type switching center (14) arranged to control the switching of communications of a first kind to mobile stations (10) in said cellular mobile communication system, and a second type switching center (15) arranged to control the switching of communications of a second kind to mobile stations (10) in said cellular mobile communication system, said first type switching center (14) comprising a controller (141) arranged such that when the first type switching center (14) receives notification (20) of a new communication of the first kind to be switched to a mobile station (10) that is the destination of said new communication, the controller (141) executes a procedure for determining (S31) whether said destination mobile station (10) is conducting a communication of the second kind, and if so, sending (S35) a notification message (21) from said first type switching center (14) to said second type switching center (15), and when said first type switching center (14) receives communication condition information from said second type switching center (15), said controller (141) being arranged to execute a switching determination procedure (25) for determining a cell through which said new communication of the first kind is to be switched to said destination mobile station (10), on the basis of said communication condition information.

7. A second type switching center (15) for a cellular mobile communication system that comprises a first type switching center (14) arranged to control the switching of communications of a first kind to mobile stations

(10) in said cellular mobile communication system, and a second type switching center (15) arranged to control the switching of communications of a second kind to mobile stations (10) in said cellular mobile communication system, said second type switching center (15) comprising a controller (151) arranged such that when the second type switching center (15) receives from the first type switching center a notification message (21) that notifies said second type switching center (15) of a new communication of the first kind to be switched to a destination mobile station (10) for which the second type switching center is controlling a communication of the second kind, the controller (151) executes a procedure for sending (S41) a request (22) from said second type switching center (15) to said destination mobile station (10) for information on the communication conditions for communications of said first kind in the momentary cell (C7) through which the destination mobile station (10) is conducting the communication of the second kind and on one or more neighboring cells (C1-C6), and when the second type switching center (15) receives communication condition information from said destination mobile station (10), said controller (151) being arranged to execute a procedure for forwarding (S42) said communication condition information to said first type switching center (14).

8. A mobile station (10) for a cellular mobile communication system that comprises a first type switching center (14) arranged to control the switching of communications of a first kind to mobile stations (10) in said cellular mobile communication system, and a second type switching center (15) arranged to control the switching of communications of a second kind to mobile stations (10) in said cellular mobile communication system, said mobile station (10)

comprising a controller (101) arranged such that when said destination mobile station (10) receives from said second type switching center (15) a request (22) for information on the communication conditions for communications of said first kind in a momentary cell (C7) through which the mobile station (10) is conducting a communication of the second kind and on one or more neighboring cells (C1-C6), said controller (101) executes a procedure for determining (S51) communication conditions for communications of said first kind in said momentary cell (C7) and at least one of said neighboring cells (C1-C6) and for sending (S52) communication condition information (23) based on the determined communication conditions to said second type switching center (15).

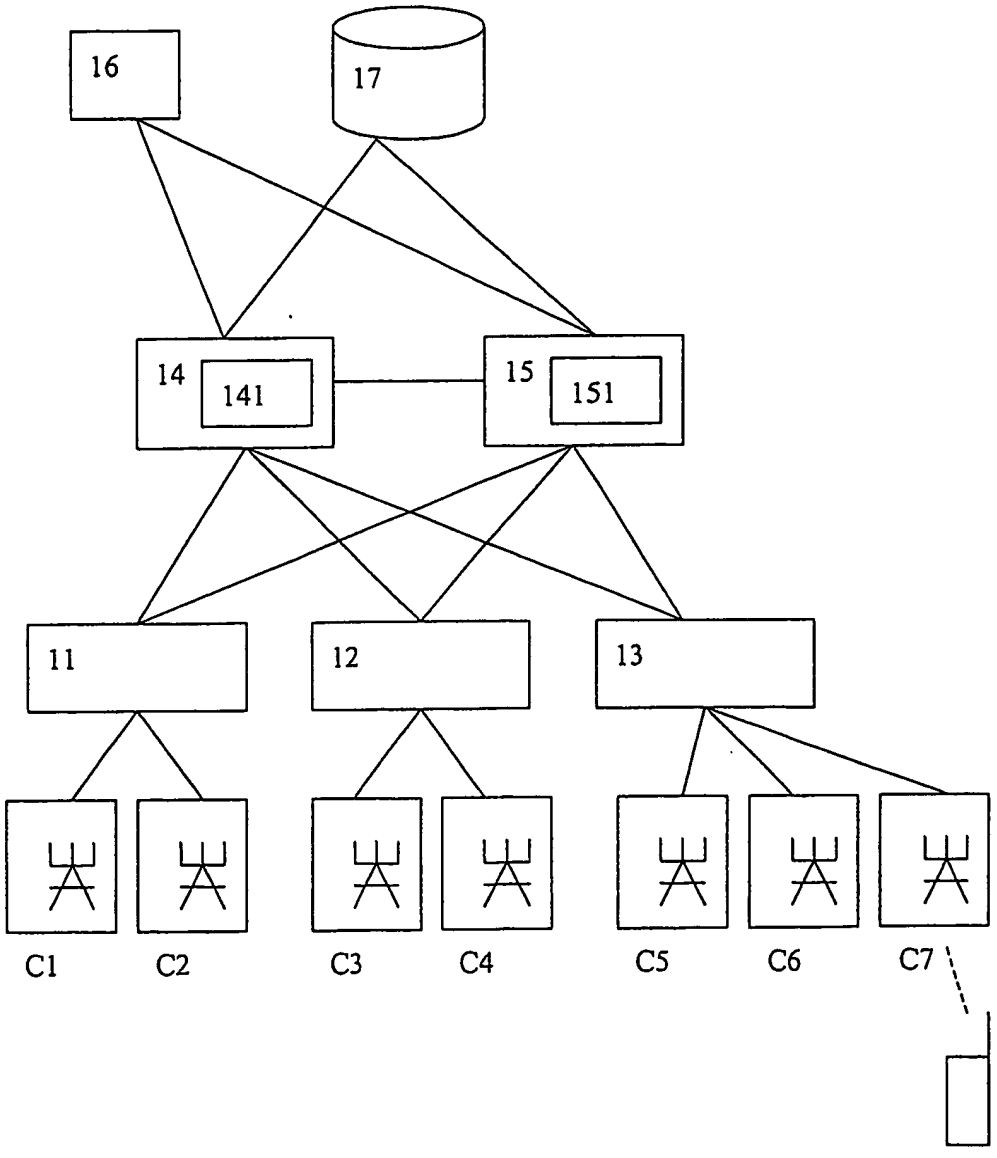

Fig. 1a

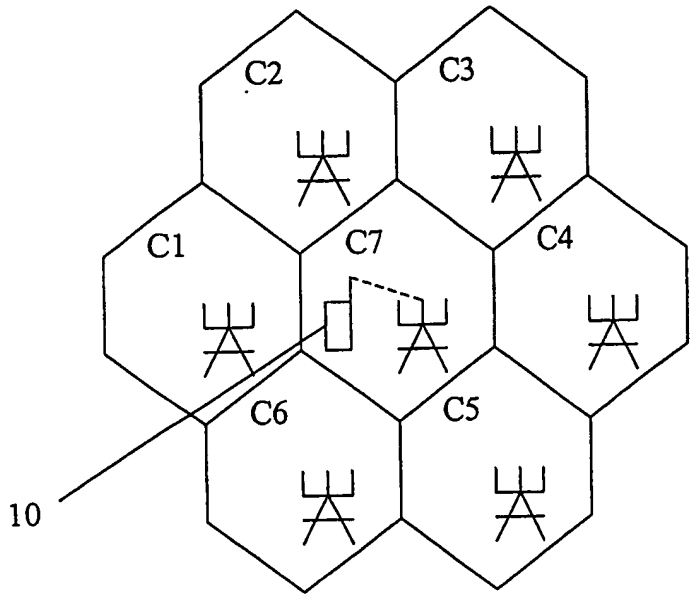

Fig. 1b

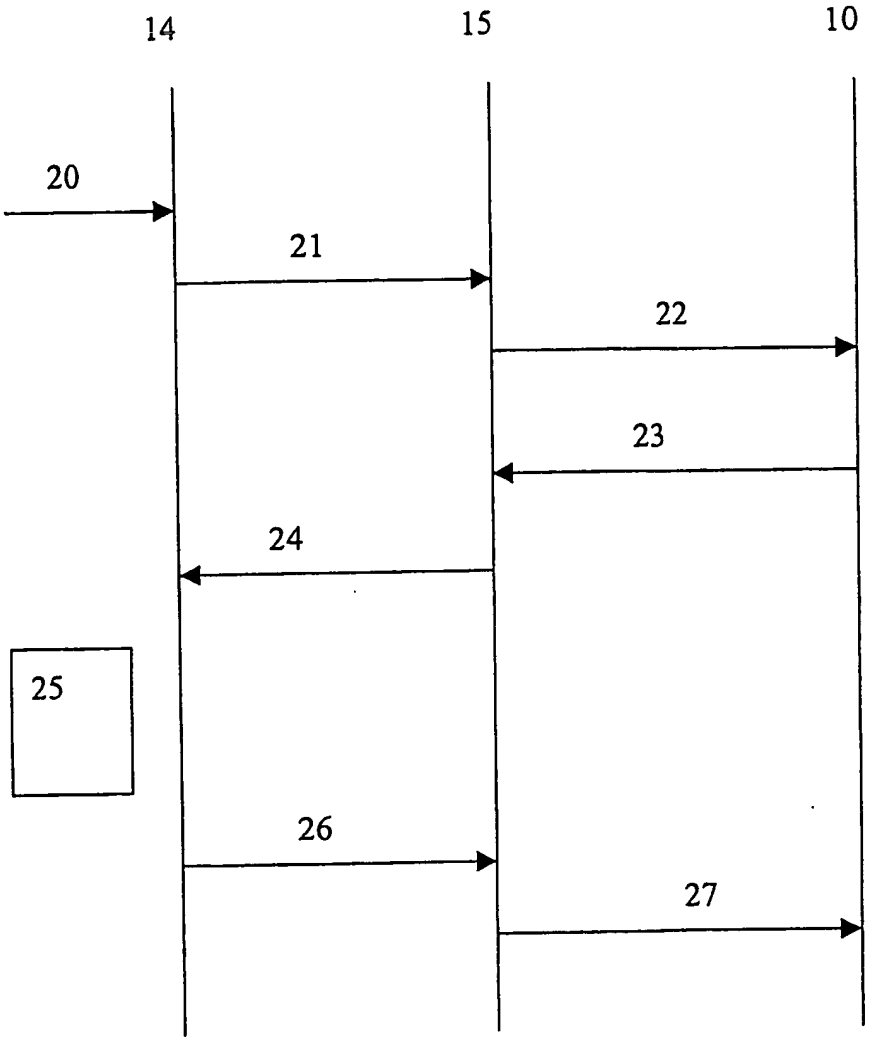

Fig. 2

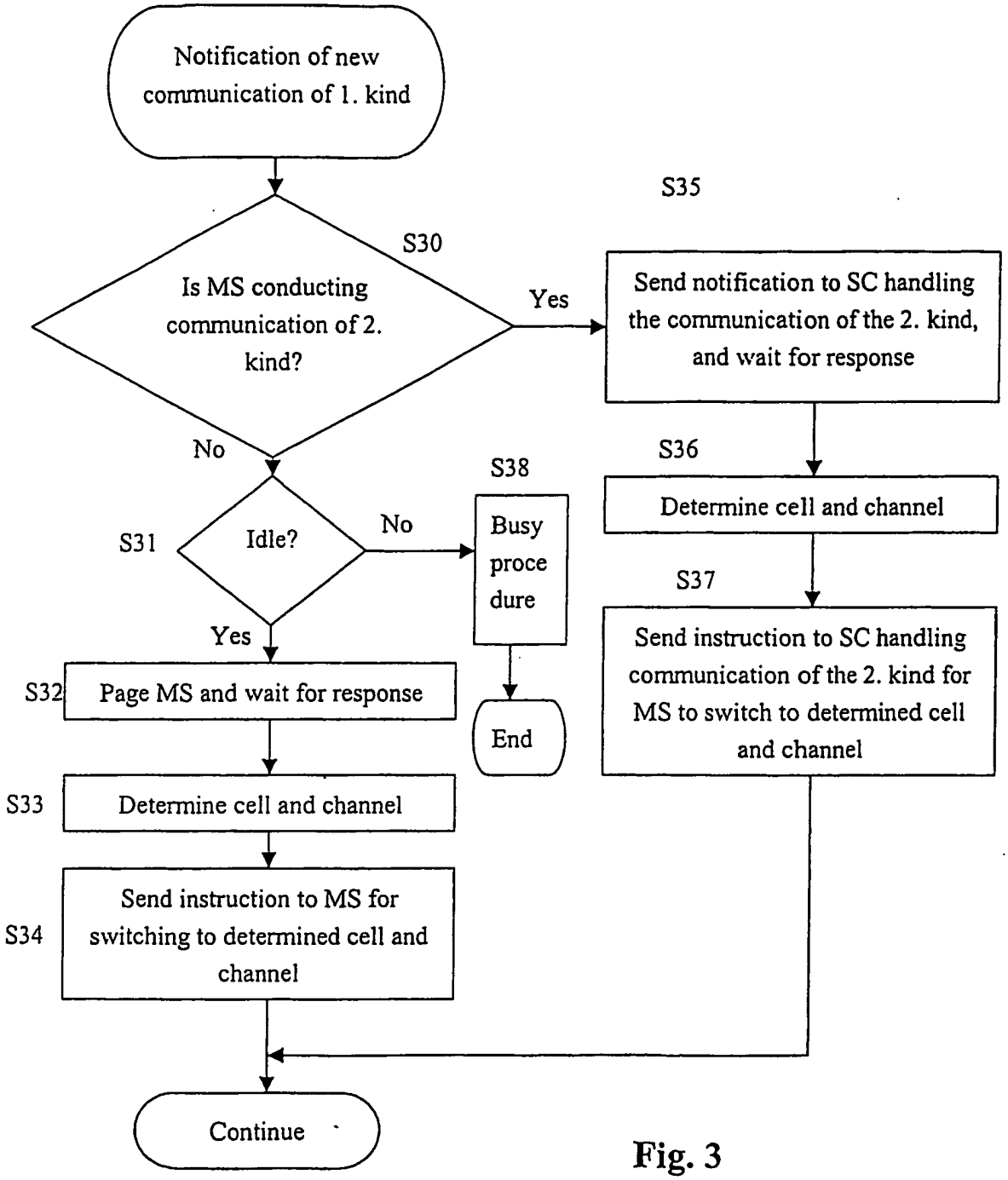
Notification of new communication of 1. kind
S30
Is MS conducting communication of 2. kind?
Yes
S35
Send notification to SC handling the communication of the 2. kind, and wait for response
S36
Determine cell and channel
S37
Send instruction to SC handling communication of the 2. kind for MS to switch to determined cell and channel
No
S31
Idle?
No
S38
Busy proce dure
End
Yes
S32
Page MS and wait for response
S33
Determine cell and channel
S34
Send instruction to MS for switching to determined cell and channel
Continue

Fig. 3

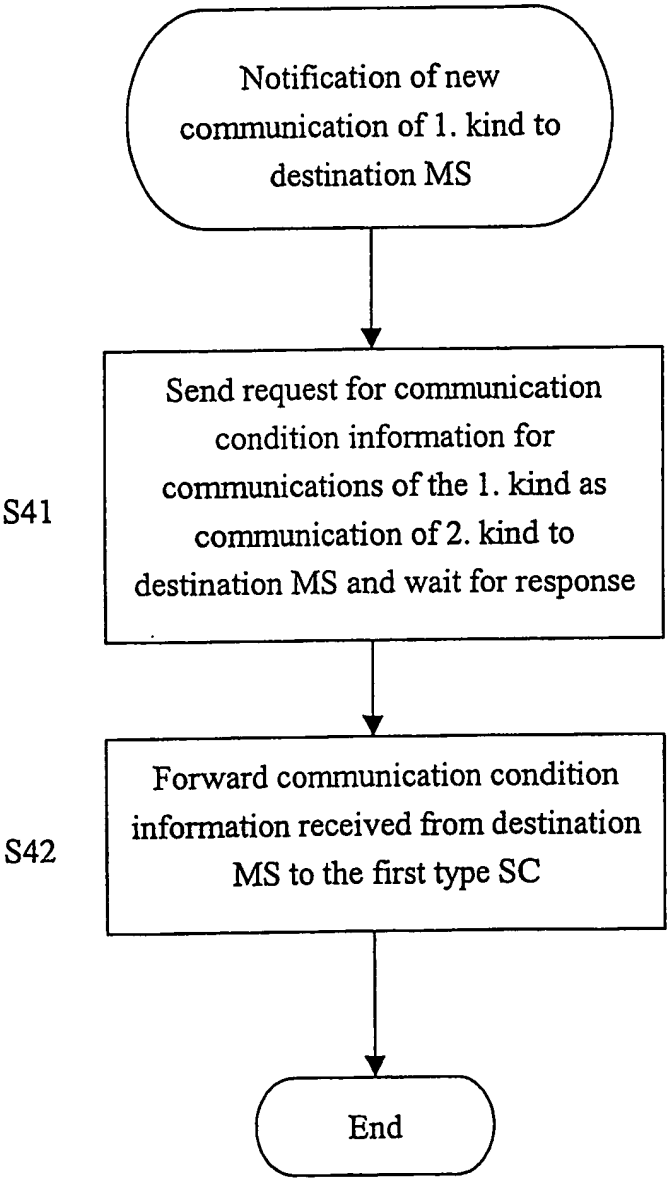
Notification of new communication of 1. kind to destination MS
S41
Send request for communication condition information for communications of the 1. kind as communication of 2. kind to destination MS and wait for response
S42
Forward communication condition information received from destination MS to the first type SC
End

Fig. 4

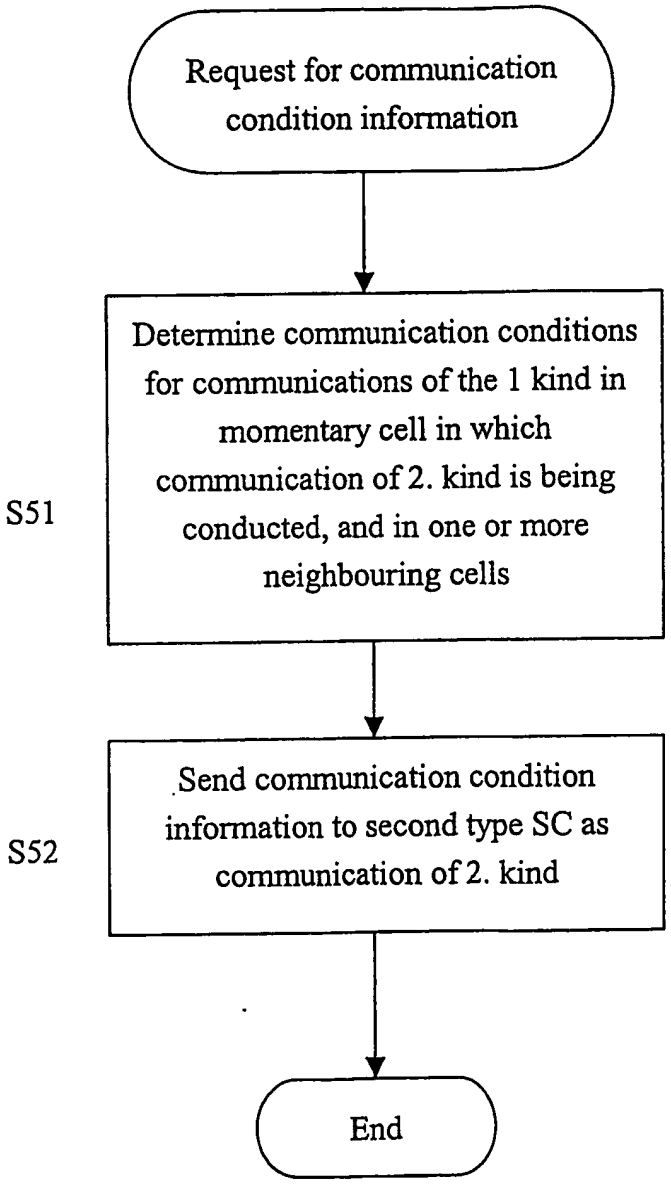
Request for communication condition information
Determine communication conditions for communications of the 1 kind in momentary cell in which communication of 2. kind is being conducted, and in one or more neighbouring cells
S51
Send communication condition information to second type SC as communication of 2. kind
S52
End

Fig. 5

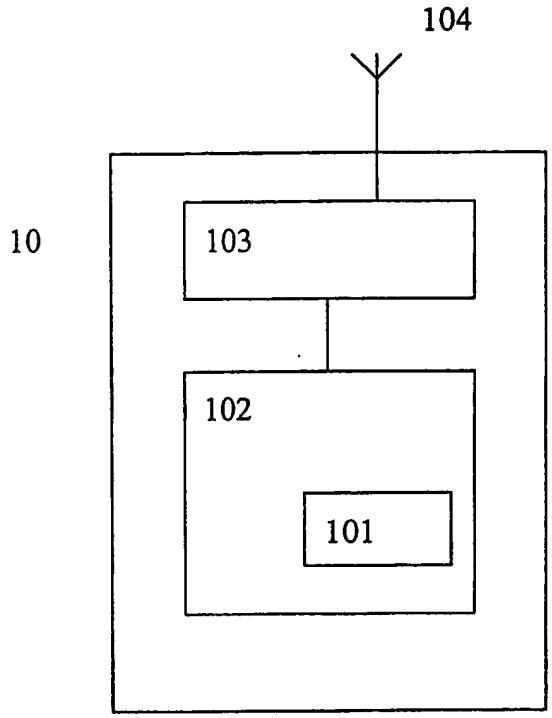

Fig. 6

INTERNATIONAL SEARCH REPORT

International Application No
PCT/EP 02/08156

A. CLASSIFICATION OF SUBJECT MATTER
IPC 7 H04Q7/38

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 7 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)
WPI Data, EPO-Internal

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 00 41425 A (ERICSSON TELEFON AB L M) 13 July 2000 (2000-07-13) page 3, line 20 - line 27 page 4, line 26 -page 6, line 2 page 7, line 4 - line 10 page 8, line 8 - line 18 page 15, line 4 - line 30	1-10
A	US 2002/090975 A1 (LAIHO KEIJO ET AL) 11 July 2002 (2002-07-11) paragraph '0039! - paragraph '0054!	1-10
A	US 5 790 528 A (MUSZYNSKI PETER) 4 August 1998 (1998-08-04) the whole document	1-10

☐ Further documents are listed in the continuation of box C.

☒ Patent family members are listed in annex.

° Special categories of cited documents :

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"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
11 February 2003	12/03/2003

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	Harrysson, A

Form PCT/ISA/210 (second sheet) (July 1992)

INTERNATIONAL SEARCH REPORT

International Application No
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